Foundations of Math 11 - Chapter 5 and Chapter 6 Exam Review

Multiple Choice

Identify the choice that best completes the statement or answers the question.

C 1. What is the boundary line for the linear inequality $y < -2x + 9$?

A) $y = -2x + 18$
B) $y = -4x + 36$
C) $y = -2x + 9$
D) $x = -2y + 18$

Change to an "=" sign

A 2. Which test point is in the solution set for the linear inequality $\{(x, y) \mid x + y < 3, x \in W, y \in W\}$?

A) (1, 1)
B) (–2, 5)
C) (2, 2)
D) $\left(\frac{1}{2}, \frac{1}{2}\right)$

(1,1) x y
x+y < 3
1+1
2

Since 2<3, (1,1) is in the solution set for x+y<3.

A 3. Describe the boundary lines for the following system of linear inequalities.

$\{y < 3x + 12, y \geq -x, x \in R, y \in R\}$

Dashed Solid

A) Dashed line along $y = 3x + 12$; solid line along $y = -x$
B) Dashed line along $y = 3x + 12$; dashed line along $y = -x$
C) Solid line along $y = 3x + 12$; dashed line along $y = -x$
D) Solid line along $y = 3x + 12$; solid line along $y = -x$

A

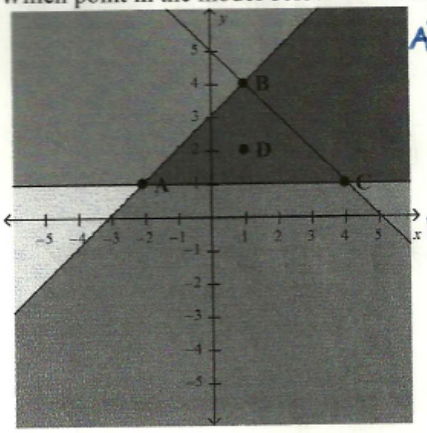
4. A vending machine sells pop and juice.
   - The machine holds, at most, 200 cans of drinks.
   - Sales from the vending machine show that at least 3 cans of juice are sold for each can of pop.
   - Each can of juice sells for $1.50, and each can of pop sells for $1.00.

   Let x represent the number of cans of pop.
   Let y represent the number of cans of juice.
   What are the restrictions on x and y?

   A) $x \in W, y \in W$ (positives and negatives)
   B) $x \in I, y \in I$ (fractions and decimals)
   C) $x \in R, y \in R$
   D) No constraints.

C

5. Which point in the model below would result in the maximum value of the objective function $W = 5y - 10x$?



A) $W = 5y - 10x$
$= 5(4) - 10(1)$
$= 20 - 10$
$= 10$

B) $W = 5y - 10x$
$= 5(1) - 10(4)$
$= 5 - 40$
$= -35$

C) $W = 5y - 10x$
$= 5(1) - 10(-2)$
$= 5 + 20$
$= 25$ *

D) $W = 5y - 10x$
$= 5(2) - 10(1)$
$= 10 - 10$
$= 0$

A) B (1, 4)
B) C (4, 1)
C) A (–2, 1)
D) D (1, 2)

A 6. Brent found spiders and grasshoppers in his barn.
- There were at most 12 spiders and at least 10 grasshoppers.
- There were no more than 36 spiders and grasshoppers, in total.

Let s represent the number of spiders and let g represent the number of grasshoppers.
Which inequality represents a restriction of s and g based on the given information?

(A) $s \leq 12$ B) $g \leq 12$ C) $g < 10$ D) $s < 10$

C 7. Brent found spiders and grasshoppers in his barn.
- There were at most 15 spiders and at most 20 grasshoppers.
- There were no more than 30 spiders and grasshoppers, in total.

Let s represent the number of spiders and let g represent the number of grasshoppers.
Which inequality represents a restriction of s and g based on the given information?

A) $g \leq 30$ B) $g \geq 30$ (C) $g \leq 20$ D) $g \leq 15$

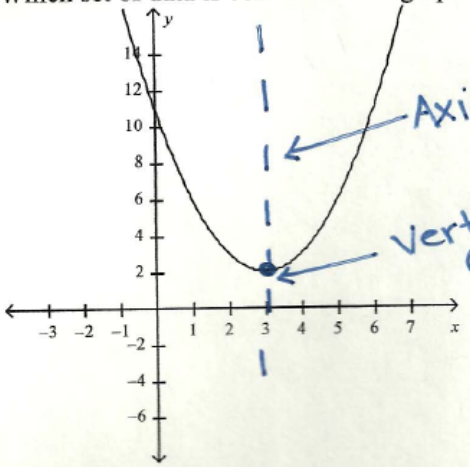
A 8. Audrey notices the number of dogs and people in a dog park.
- There are more people than dogs.
- There are at least 12 dogs.
- There are no more than 40 dogs and people, in total. $d + p \leq 40$

Let d represent the number of dogs and let p represent the number of people.
Which inequality represents a restriction of d and p based on the given information?

(A) $d + p \leq 40$ B) $d + p < 40$ C) $d + p \geq 40$ D) $d + p > 40$

A

9. Which set of data is correct for this graph?



* Domain
{x ∈ R}
* * Range
{y | y ≥ 2, y ∈ R}

	Axis of Symmetry	Vertex	Domain	Range
A.	$x = 3$	(3, 2)	$x \in R$	$y \geq 2$
B.	$x = 3$	(2, 3)	$x \in R$	$y \in R$
C.	$x = 2$	(2, 3)	$-1 \leq x \leq 7$	$y \geq 2$
D.	$x = 3$	(3, 2)	$-2 \leq x \leq 8$	$y \geq 0$

A) Set A.
B) Set C.
C) Set D.
D) Set B.

A 10. What are the x- and y-intercepts for the function $y = x^2 - 2x - 8$?

(A) $x = -2, x = 4, y = -8$
B) $x = -2, x = 2, y = -8$
C) no x-intercepts, $y = -8$
D) $x = -4, x = 4, y = -8$

* To find x-ints... FACTOR ↑ y-int

$x^2 - 2x - 8 = 0$ $2 \times -4 = -8$ $2 + -4 = -2$
$(x+2)(x-4) = 0$
$x+2=0$ or $x-4=0$
$x=-2$ $x=4$

A 11. The points (–2, 4) and (1, 4) are located on the same parabola. What is the equation for the axis of symmetry for this parabola?

(A) $x = -0.5$
B) $x = -1$
C) $x = 0.5$
D) $x = -1.5$

To find equation of axis of symmetry:

$x = \frac{-2+1}{2}$

$x = \frac{-1}{2}$ or -0.5

D 12. Solve $x^2 + 5x + 4 = 0$ by factoring.

A) $x = -5, x = -1$
B) $x = 5, x = 1$
C) $x = 4, x = 1$
(D) $x = -4, x = -1$

$x^2 + 5x + 4 = 0$ $1 \times 4 = 4$ $1 + 4 = 5$
$(x+1)(x+4) = 0$
$x+1=0$ or $x+4=0$
$x=-1$ $x=-4$

B 13. Solve $x^2 - 10x - 24 = 0$ by factoring.

A) $x = -8, x = -3$
B) $x = -2, x = 12$
C) $x = 2, x = -12$
D) $x = -6, x = -4$

$x^2 - 10x - 24 = 0$ $-12 \times 2 = -24$
$(x-12)(x+2) = 0$ $-12 + 2 = -10$
$x - 12 = 0$ or $x + 2 = 0$
$x = 12$ $x = -2$

B 14. Solve $100x^2 - 121 = 0$ by factoring.

A) $x = 10, x = -11$
B) $x = \frac{11}{10}, x = -\frac{11}{10}$
C) $x = \frac{10}{11}, x = -\frac{10}{11}$
D) $x = 11, x = -11$

$100x^2 - 121 = 0$
$(10x - 11)(10x + 11) = 0$
$10x - 11 = 0$ or $10x + 11 = 0$
$\frac{10x}{10} = \frac{11}{10}$ $\frac{10x}{10} = \frac{-11}{10}$
$x = \frac{11}{10}$ $x = -\frac{11}{10}$

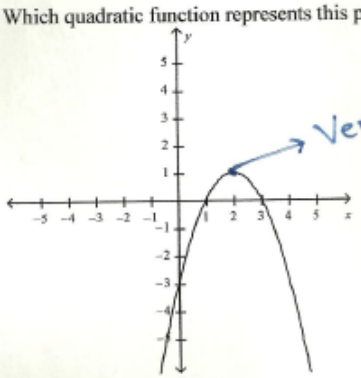
B 15. Which set of data is correct for the quadratic relation $f(x) = -2(x - 12)^2 + 15$?

	Direction parabola opens	Vertex	Axis of Symmetry
A.	downward	(15, –12)	$x = 15$
B.	downward	(12, 15)	$x = 12$
C.	upward	(–12, 15)	$x = -12$
D.	upward	(15, 12)	$x = 15$

A) Set D.
B) Set B.
C) Set A.
D) Set C.

Watch Order!

A 16. Which quadratic function represents this parabola?



Vertex: (2, 1)
* Opens downward
↳ begins with a "−".

(A) $y=-(x-2)^2+1$
B) $y=-(x+2)^2-1$
C) $y=(x-2)^2+1$
D) $y=-(x+2)^2+1$

D 17. Solve $2x^2-3x+1=0$ using the quadratic formula.

A) $x=1, x=-\frac{1}{2}$
B) $x=1, x=-\frac{1}{2}$
C) $x=-1, x=\frac{1}{2}$
(D) $x=1, x=\frac{1}{2}$

$a=2, b=-3, c=1$

$$x=\frac{-b\pm\sqrt{b^2-4ac}}{2a}$$

$$x=\frac{3\pm\sqrt{(-3)^2-4(2)(1)}}{2(2)}$$

$$x=\frac{3\pm\sqrt{9-8}}{4}$$

$$x=\frac{3\pm\sqrt{1}}{4}$$

$$x=\frac{3\pm1}{4}$$

$x=\frac{3+1}{4}$ or $x=\frac{3-1}{4}$

$x=\frac{4}{4}$ $x=\frac{2}{4}$

$x=1$ $x=1/2$

B 18. Solve $9x^2 + 6x + 1 = 0$ using the quadratic formula.

A) $x = \frac{1}{3}$

B) $x = -\frac{1}{3}$

C) $x = 0, x = -\frac{1}{3}$

D) $x = 0, x = \frac{1}{3}$

$a=9, b=6, c=1$

$$x = \frac{-b \pm \sqrt{b^2-4ac}}{2a}$$

$$x = \frac{-6 \pm \sqrt{(6)^2-4(9)(1)}}{2(9)}$$

$$x = \frac{-6 \pm \sqrt{36-36}}{18}$$

$$x = \frac{-6 \pm \sqrt{0}}{18}$$

$x = -6/18$ or $-1/3$.

19. Graph the solution set for the following system of inequalities.

$\{(x, y) \mid x + 5y \leq 5, y + 5 > x, x \in \mathbf{R}, y \in \mathbf{R}\}$

Equations of boundary lines:

→ $x+5y=5$ (solid) → $y+5=x$ (dashed)

x-int: $x+5(0)=5$, $x=5$

y-int: $0+5y=5$, $\frac{5y}{5}=\frac{5}{5}$, $y=1$

Test Point; (0,0)

L.S	≤	R.S
$x+5y$		5
$0+5(0)$		
$0+0$		
0		

$0 \leq 5$, therefore (0,0) is located in the solution region.

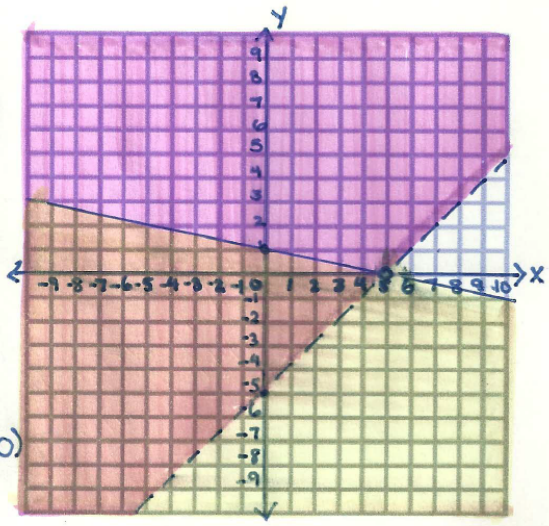
x-int: $0+5=x$, $5=x$

y-int: $y+5=0$, $y=-5$

Test Point; (0,0)

L.S.	>	R.S
$y+5$		x
$0+5$		0
5		

$5 > 0$, therefore (0,0) is located in the solution region.



20. Jennifer has two summer jobs.
- She works no more than a total of 40 h a week.
  Both jobs allow her to have flexible hours but in whole hours only.
- At the ice cream shop, Jennifer works no less than 18 h and earns $10.00/h.
- At the pool, Jennifer works no more than 20 h and earns $10.75/h.

List the Defining Statements.

Let x represent the # of hours Jennifer works at the icecream shop
Let y represent the # of hours Jennifer works at the pool.
Let E represent her total earnings.

List the restrictions.

$x \in W, y \in W$

List the constraints.

$x \geq 18$

$y \leq 20$

$x + y \leq 40$

State the objective function.

$E = 10.00x + 10.75y$

21. Solve $x^2 - x - 5 = 0$ using the quadratic formula. State the solution as exact values.

$a=1, b=-1, c=-5$

$$x = \frac{-b \pm \sqrt{b^2-4ac}}{2a}$$

$$x = \frac{1 \pm \sqrt{(-1)^2-4(1)(-5)}}{2(1)}$$

$$x = \frac{1 \pm \sqrt{1+20}}{2}$$

$$x = \frac{1 \pm \sqrt{21}}{2}$$

22. Solve $2x^2 + 8x + 2 = 0$ using the quadratic formula. State the solution as exact values.

$a=2,\ b=8,\ c=2$

$$x = \frac{-b \pm \sqrt{b^2-4ac}}{2a}$$

$$x = \frac{-8 \pm \sqrt{(8)^2-4(2)(2)}}{2(2)}$$

$$x = \frac{-8 \pm \sqrt{64-16}}{4}$$

$$x = \frac{-8 \pm \sqrt{48}}{4}$$

h K x y

23. A parabola with the vertex (–7, –2) passes through the point (–9, 10). Determine the equation for this parabola. **Express your final answer in vertex form.**

$y = a(x-h)^2+K$

$y = a(x--7)^2-2$

$y = a(x+7)^2-2$

$10 = a(-9+7)^2-2$

$10 = a(-2)^2-2$

$10 = a(4)-2$

$10 = 4a-2$

$10+2 = 4a$

$\frac{12}{4} = \frac{4a}{4}$

$3 = a$

$y = 3(x+7)^2-2$